A NEW GENUS AND FIRST RECORD OF CHRYSOMELINAE FROM NEW CALEDONIA (COLEOPTERA: CHRYSOMELIDAE)

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Zira new genus is described from New Caledonia, for *Zira nitens* sp. nov. *Zira* belongs in the Phyllocharitini and is the first member of the subfamily Chrysomelinae to be recorded from New Caledonia. The third instar larva is described. ❑ *New Caledonia, Chrysomelidae, new genus, Coleoptera.*

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The Chrysomelinae is one of the largest subfamilies of the large beetle family Chrysomelidae. It is diverse in the Southern Hemisphere on fragments of the former continental landmass Gondwana, but has not been recorded from New Caledonia (Daccordi, 1994), which is one of the smaller rafted fragments of that continent (Kroenke, 1996).

A recent collecting trip by the staff of the Queensland Museum to New Caledonia discovered a large species of Chrysomelinae high on the island's second highest mountain massif. This discovery raises the number of subfamilies in the New Caledonia island group to 9, I introduced (Bruchinae: Delobel et al., 2003) and 8 native: Cassidinae (Gressitt, 1960; Borowiec, 1999), Chrysomelinae, Criocerinae (Monrós, 1960), Cryptocephalinae (Fauvel, 1907), Eumolpinae (Lefèvre, 1885), Galerucinae (Samuelson, 1973), Lamprosomatinae (Monrós, 1956), Spilopyrinae (Reid, 2000). The new taxon belongs to the tribe Phyllocharitini, which is also the only tribe of Chrysomelinae found in New Zealand, as *Aphilon* Sharp, placed with *Phaedon* von Muelfeld in the tribe Chrysomelini (Daccordi, 1994), is a small phyllocharitine (Reid, 1995a,b). Members of the tribe Phyllocharitini occur mainly in the Southern Hemisphere and are extremely diverse in size, shape and life-history, but the New Caledonian specimens do not conform with any known genus and are therefore described as new.

In the following descriptions, larval sclerites are identified according to the nomenclatural system devised by Kimoto (1962), as used for Phyllocharitini by Reid (1991). Specimens are deposited in: Australian Museum, Sydney (AMS), Natural History Museum, Paris (MHNP), Queensland Museum, Brisbane (QMB).

Zira gen. nov.

TYPE SPECIES. *Zira nitens* sp. nov.

ETYMOLOGY. From the extinct New Caledonian language Zira or Zire (arbitrarily designated feminine) (see www.ethnologue.com/show_country.asp?name=New+Caledonia).

DESCRIPTION. *Adult. Head* (Figs 1B, 2A). Median part of frons and clypeus almost flat, with frontoclypeal suture feebly and evenly depressed and without groove or ridge from antennal base to eye; eye narrow, without emargination, placed on middle of lateral swelling of head, short posterior part of swelling (temple) contracted to parallel-sided neck; antenna situated on anterior margin of head, lower margin of head without ridge or groove between eye and mouth for retention of antenna; clypeus strongly transverse with triangular basal margin; all antennal segments elongate, of similar length and width; labrum densely setose anteriorly, with 6-9 pairs of setae; mandible with 2 apical teeth and thick but soft membranous pad near middle of inner margin; last 2 segments of maxillary palpi equal in length, apical elongate or quadrate but inner margin slightly shorter than outer, with truncate apex (slightly broader in male), penultimate segment almost triangular, first segment not grooved to receive apical segment; mentum strongly transverse, curved, with concave apical margin.

Thorax (Figs 1-2). Pronotum with single large seta in a pit (trichobothrium) on the raised margin of each angle, anterior angles rounded, hind angles slightly produced as lateral triangular teeth; pronotum transverse, broadest at base, sides evenly contracted to apex, anterior margin

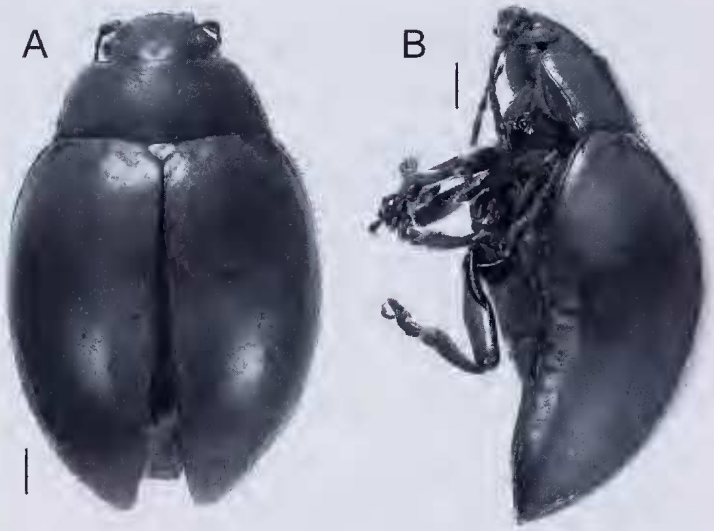

FIG. 1. *Zira nitens* Reid & Smith, adult ♂. A, dorsal (note apices of wings); B, lateral.

strongly and evenly concave; lateral and anterior margins of pronotum bordered; hypomeron without grooves or excavations; prosternum almost flat, without lateral ridges, process medially depressed and expanded at apex, about as broad as long; procoxal cavities open, hypomeral lobe short, slightly less than half width of procoxa; elytral humeri absent, elytra smoothly convex except shallow oblique basal groove towards lateral margin; epipleuron broad, at base twice width of metepisternum, entirely visible from sides, sloped at c45° from vertical, gradually attenuated to apex, without setae; anterior elytral wingbinding patch on oval swelling one third from base; median portion of mesoventrite covered by prosternal process, except concave apex of transverse lobe; wings reduced to oar-shaped unfolded strips almost as long as elytra, with single large vein; metaventrite with simple narrowly ridged margins; metendosternite with extremely short basal stalk and thin lateral arms; tibiae without ridges on external faces; first tarsal segments of male each with patch of spatulate setae, of female with simple setae and without glabrous midline; third tarsal segment not bilobed, apex truncate or shallowly concave; claws appendiculate.

Abdomen (Figs 3-4). Pygidium smooth, without median groove; sides of each ventrite bordered, margination convex; ventrites I-II fused; ventrite I with broad, truncate, intercoxal process and narrow basal border; ventrite V evenly convex, with simple medially convex (male) or truncate (female) apex; tergite VIII with distinct spiracles; sternite IX of male reduced to 2 separate struts; tegmen short and V-shaped, junction of arms weakly sclerotised; penis elongate, evenly curved in profile, smooth-walled, with small basal foramen and thin flagellum which protrudes from apex of penis in repose and includes two basal valvular structures within the endophallus; ovipositor with well-developed tergite VIII and

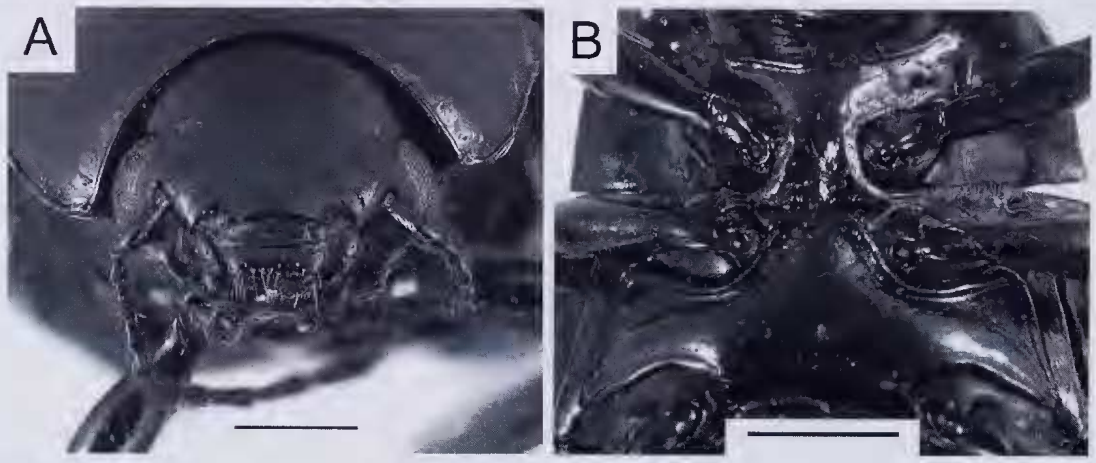

FIG. 2. *Zira nitens* Reid & Smith, adult ♂. A, head; B, venter of thorax.

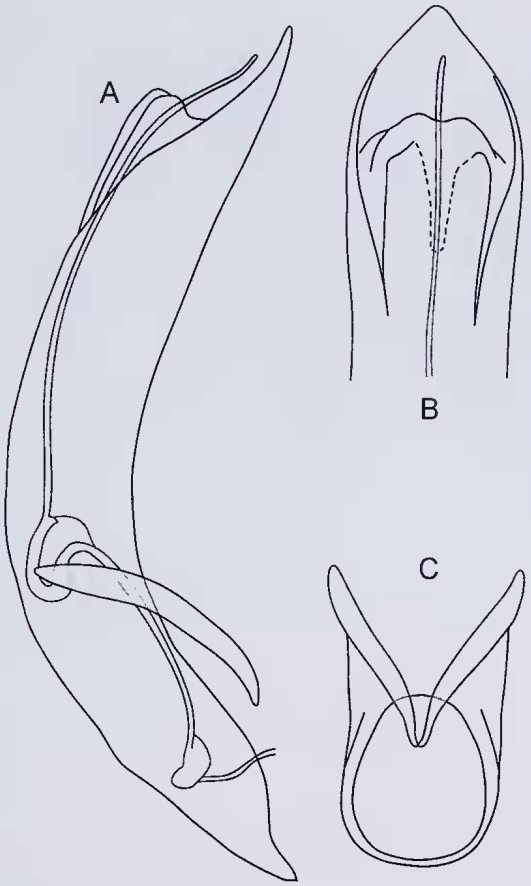

FIG. 3. *Zira nitens* Reid & Smith, adult ♂. A, aedeagus, lateral view, showing flagellum in relaxed position; B, apex of penis, dorsal view; C, tegmen and base of penis, ventral view.

sternite VIII (but without basal spiculum), simple quadrate sternite IX, pair of elongate two-segmented palpi, pair of well-developed paraprocts partly enclosing basal half of palpi and pair of irregular strip-like proctigers dorsal to these; spermatheca irregularly shaped, with well-developed basal bulb between gland and duct, latter loosely coiled, of uniform width, partly invaginated into basal bulb.

Pupa. The pupa of *Zira* is unknown.

Larva (Figs 5-6). Number of larval instars unknown. Diagnostic description of late instar larva: body form elongate, without dorsal or lateral eversible glands; all setae short (much less than than half depth of head), head setae acute, most dorsal and lateral body setae slightly clubbed; head circular, surface smooth, not microsculptured; frontal sutures attenuated, not reaching antennal cavities; 3-segmented antennae not set on prominent angular lobes; labrum deeply emarginate; mandibles palmate, third tooth largest, without prostheca; all body segments with well-defined sclerites, identified as follows: prothorax: D-DL-EP, trochantin, P, ES fused across midline, SS; mesothorax: Da (tuberculate), Dpi (tuberculate), Dpe (poorly differentiated from Dpi), DLai, DLpi, spiracle, DLe, EPa (with large protruding tubercle), EPP, trochantin, P, ES, SS; metathorax as mesothorax but without spiracle; abdomen: segments I-VI: Da (with large dorsally prominent tubercle), Dpi (with small tubercle), Dpe, DLai, DLae, DLp (large and folded), spiracle, EP (massive and posterolaterally protuberant), P, ES, SS; segment VII: all sclerites fused above laterally placed spiracles, except DLai and DLae; segment VIII: all sclerites fused above laterally placed spiracles; segment IX: spiracles absent, dorsal and lateral selerites fused forming a thick single plate, with setae on tubercles, enclosing venter and segment X; all spiracles annular; paired pseudopoda, ovoid in ventral view, with setose anterior margins, on sternites V-VIII; tarsunguli simple, without basal tooth or angular projection.

Egg. Unknown, but maturing eggs in the ovarioles were smooth and relatively large.

Biology. Host unknown, plant fragments in guts of adults and larva not identifiable. Oviparous.

Zira nitens sp. nov.
(Figs 1-6)

ETYMOLOGY. Latin *niteo*, shine; for the shining dorsal surface.

MATERIAL (all New Caledonia). HOLOTYPE: ♂ Mt Humboldt, refuge, 21°53'S 166°25'E, hand coll. 1350m, 5-8.xi.2002, Burwell, Monteith & Wright, 11136 (MHNP); PARATYPES (9): 1♂, 2♀, 1 late instar larva (in ethanol), same data as holotype (QMB); 2 ♂, 2 ♀, same data except: night collecting, 11131 (AMS, QMB); 1 ♀, Mt Ouin, 22°01'S 166°28'E, beating, 1100m, 9.xi.2002, S. Wright (QMB).

DESCRIPTION. *Size and shape*. Length: males, 9.5-10mm, females, 10-11.5mm; length to width ratio 1.6; length to height ratio: 2.6-2.7. Body ovoid in dorsal view, sides almost evenly curved from head to elytral apex; dorsum strongly convex in lateral view, but pronotum and elytra separately so, and venter convex with meta-ventrite most prominent.

Colour. Entirely dark metallic greenish-black, antennae, tarsi and margins of elytra sometimes bluish-purplish, labrum sometimes reddish-

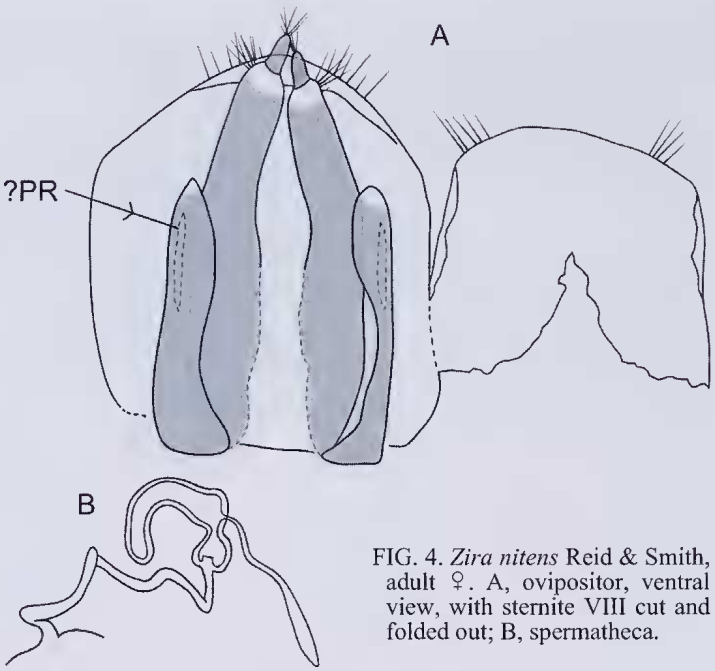

FIG. 4. *Zira nitens* Reid & Smith, adult ♀. A, ovipositor, ventral view, with sternite VIII cut and folded out; B, spermatheca.

brown, postclypeal membrane and apices of maxillary palpi yellowish-brown.

Surface sculpture. Pubescence: dorsal surfaces largely glabrous, with >6 pairs of setae on apical half of labrum, 2 pairs at apex of clypeus, 1-2 minute trichobothrial setae near inner margin of eye, trichobothrial setae at each corner of pronotum; setae increasingly dense on antennal segments, from sparse on first to dense on seventh, and uniformly dense on 8-11; venter sparsely setose, except hypomeron, sides of prosternum and metaventrite glabrous; tibiae with densely setose apices in both sexes; male with small ovoid patch of spatulate setae in middle of each first tarsomere; puncturation: upper surfaces with small, but variably sized, sparse punctures, absent from scutellum, usually inconspicuous or absent on elytra, usually stronger and denser on pronotum; a few much larger punctures at inner margin of eye, scattered along hind margin of pronotum, adjacent to upper margin of epipleuron and occasionally elsewhere; lower surfaces similar to upper but without scattered large punctures and abdominal ventrites often rugose, with obscured punctures; microsculpture: dorsal surfaces generally smooth, shining and without microsculpture, scutellum microreticulate, elytra may be faintly wrinkled or even microtuberculate at apices; ventral surfaces of thorax usually smooth, of ventrites usually finely microreticulate and often finely rugose.

Head. Inner margin of eye with small oval depression and/or short groove; eye narrow, without canthus, depth in lateral view 2.5-3× length; antenna about half body length, inserted on apical margin of head; second antennal segment shortest, first ovoid and 6-11 slightly more expanded than 2-5.

Thorax. Pronotum transverse, width 2-2.5× length, broadest at base, sides evenly curved towards apex; basal margin shallowly convex, apical strongly concave; anterior and sides strongly margined, base not or feebly so; pronotal surface smooth or with shallow irregular impressions near lateral margins; scutellum triangular, base slightly longer than sides; elytra strongly convex laterally and dorsally, greatest height one third from base.

Genitalia. Penis cylindrical, apex elongate triangular in dorsal view (one specimen slightly assymetric, deformed through injury?), thin and almost straight in lateral view, apical foramen elongate, with two elongate sclerites and thin flagellum emerging from endophallus; flagellum continuous through length of penis, with two basal lightly sclerotised and strongly flexed swellings; spermatheca with c-shaped apex and strong constriction between insertion points of gland and spermathecal duct, latter projecting slightly into basal bulb and short with only 2-3 coils.

Larva. Late (third?) instar: length 10mm; head width 2mm; colour: head capsule, legs and all major dorsal and lateral sclerites dark, venter pale; centres of anterior tubercles on Da pale on abdominal segments VI and VII; abdominal sclerite EP more protruding, more setose and increasingly paler (from entirely dark on segment I to entirely pale on VIII) from base to apex of abdomen, sclerite P pale on abdomen; setae pale; larger setae : all head setae acute, not on tubercles, longest <0.2 head depth, vertex with single row of 5 near midline, and 7 around stemmata, frons with pair at base and 4 pairs at apical margin, clypeus with 4 pairs; pronotal shield with anterior row of c10 short clubbed

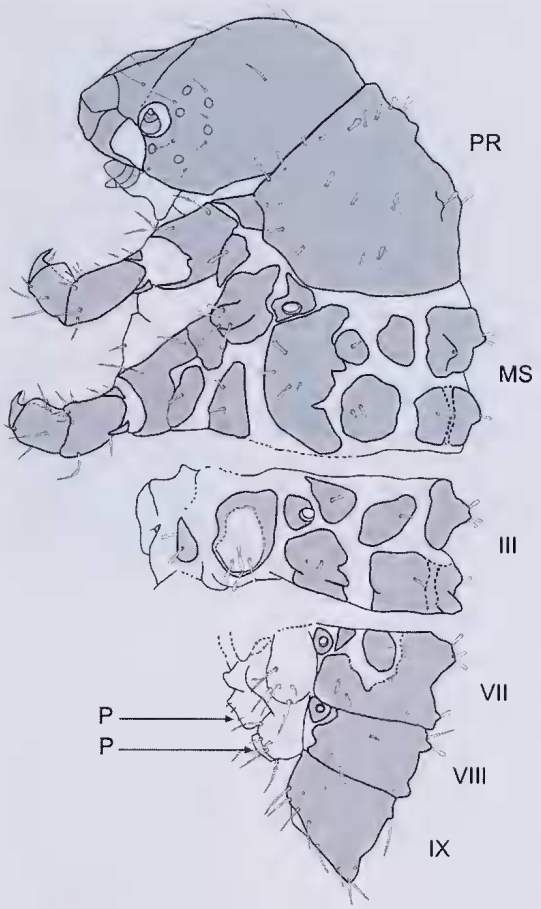

FIG. 5. *Zira nitens* Reid & Smith, late-instar larva. A, lateral, with metathorax, abdominal segments I-II and IV-VI omitted.

setae and several similar scattered behind; other dorsal and lateral thoracic and abdominal sclerites with short clubbed setae (as illustrated), the longest in a cluster at the apex of the protruding lateral EP sclerite, setae longer and mostly acute on segments VIII & IX; stemmata in 4+2 formation; leg setae acute, longest on dorsal part of tibiotarsus (as long as this segment); third segment of antenna slightly elongate, sensorium at apex of second segment almost flat; tarsungulus short, length half width, and strongly hooked, without angulate base.

DISTRIBUTION AND BIOLOGY. New Caledonia is 500km long with a highly dissected central mountain chain running its full length. Most specimens of *Zira nitens* were collected at 1,350m about 2km west of the 1,618m summit of

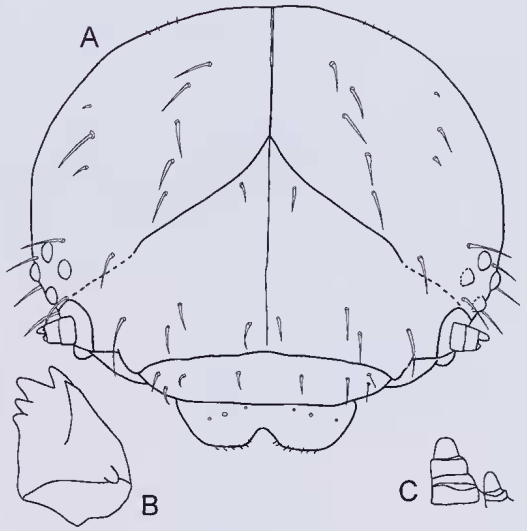

FIG. 6. *Zira nitens* Reid & Smith, late-instar larva. A, head anterior; B, left mandible, internal view; C, maxillary and labial palpi.

Mt Humboldt. This is the second highest mountain on the island and dominates the southern portion of the mountain chain about 40 km north of the capital, Nouméa. Mt Humboldt is a major relictual focus of the island with many plants endemic to its summit zone (Lowry, 1998). One additional *Zira* specimen came from 1,100m just below the summit of Mt Ouin, which is an outlier of the Humboldt massif and 15km to its south. The Humboldt specimens were all collected on the ground while headlight collecting at night in an area of stunted montane heath traversed by a path from the Humboldt helipad to the "Forêt des Mousses" (Fig. 7). Vegetation was up to a metre in height and included *Dracophyllum* (Epacridaceae), pygmy bamboo (*Greslania*, Poaceae), *Gahnia* (Cyperaceae) and ferns interspersed with patches of bare, gravelly soil. No plant association for the beetles was noted. Two other flightless black beetles, of similar size to *Zira nitens*, were active on the ground at the same time — one a eumolpine chrysomelid (*Taophila* Heller) and the other an unidentified melolonthine scarab. The single Mt Ouin specimen was taken beating low vegetation along a roadside adjacent to rather similar, but less exposed, vegetation.

PHYLOGENY AND BIOGEOGRAPHY. The adult of *Zira* is most similar to larger members of the New Zealand Phyllocharitini, *Allocharis* Sharp, *Cyrtonogetus* Broun and *Eualema* Broun,

FIG. 7. Habitat of *Zira nitens* at Mount Humboldt. (photo: Susan Wright)

with which it shares the following attributes: eyes on lateral swellings; frontoclypeus without deep grooves; at least female maxillary palpi not apically expanded; pronotum with trichobothrial setae in each corner, without irregular deep depressions at sides; pronotum with lateral and anterior borders but without obvious basal border; prosternum not anteriorly or posteriorly raised; elytra not striate, at least on disc; pads of spatulate setae on all male basal tarsi; third tarsal segment not bilobed; penis elongate, with small basal foramen; ovipositor with two segmented vaginal palp; larva without extrusible glands, with conical pre-apical ventral ampullae. Most of these similarities appear to be plesiomorphies for Phyllocharitini and the group of genera is therefore weakly defined. *Zira* most obviously differs from these genera by much greater body covexity, pronotal shape (broadest at base) and broadly open procoxal cavities (in *Cyrtonogetus crassus* Broun the procoxal cavities are open, but only narrowly so). The Australian genus *Strumatophyma* Baly is similar to *Zira*, with widely open procoxal cavities and non-striate elytra, but it has strongly grooved frontal sutures, pronotum broadest anteriorly and laterally depressed, tuberculate elytra, simple claws and a deep depression on the apical ventrite of both sexes.

The larvae of the New Zealand genera are undescribed, but the habitus of a late instar larva of *Allocharis* has been sketched (Reid, 1995a) and larvae of three genera of Australasian Phyllocharitini have been described (Kimoto, 1962; Reid, 1991). The larva of *Zira* is essentially similar to all of these, especially in having a dorsally placed pair of frontal setae, laterally tuberculate sclerites and at least 3 pairs of prolegs, but differs by setal structure, number of rows of tubercles, or sclerotisation of abdominal apex.

Determination of *Zira*'s relationships will require a phylogenetic revision of the whole tribe, but the available evidence is that *Zira* belongs to a group of genera previously only known from New Zealand.

The presence of an unusual flightless and relatively plesiomorphic member of Phyllocharitini on a rafted fragment of Gondwana strengthens the argument that this tribe is ancient. Daccordi (1994, 1996) noted relationships between phyllocharitine genera in South America, New Zealand and Australia, although nonphyllocharitine genera were included in his discussion (Reid, 1995b). Other remnant Gondwanan chrysomelids on New Caledonia include a genus of Spilopyrinae (Reid, 2000) and possibly the Lamprosomatinae (Monrós, 1956).

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